



CASE STUDY GOLDEN JUBILEE HOSPITAL, CLYDEBANK



PILING

CLIENT



MAIN CONTRACTOR



SCOPE OF WORKS

CHD piling

Project Brief

Roger Bullivant Limited (RB) won the contract to install 177 No. piles required to support the new dedicated Ophthalmology unit at the Golden Jubilee National Hospital, Clydebank on behalf of Kier Construction Scotland and NHS Scotland.

Already undertaking about 18% of all Scottish cataract procedures, the dedicated Ophthalmology centre is scheduled to open in 2020. The new unit will offer state of the art care for patients needing cataract surgery, which is one of NHS Scotland's key patient demand areas. By offering improved services and facilities, the expansion will help reduce patient waiting times and enhance patient experience.





PILING



Key Issues/Requirements

- RB was required to provide a design methodology to suit the underlying ground conditions, using both information provided by the client, along with local knowledge and extensive experience of working in the area. The ground conditions comprised an upper covering of made ground, overlying soft and firm silty CLAY to depths of circa 12.00mbgl, underlain by medium dense to dense and very dense gravelly SAND. Considerations over the preferred piling technique and system required had to be considered pre-tender to cater for deep made ground overlying soft cohesive strata.
- Several piles were located in close proximity to the existing hospital building, which was to remain fully operational for the duration of works. Again this prompted consideration over piling technique to ensure minimal disturbance to patients and staff during the time on site and to prevent damage to surrounding structures.
- The site was located within a naval construction works shipyard during WWI and WWII, and examination of WWII air raid bombing records suggested that numerous exploded and unexploded high explosive (HE) bombs affected Clydebank Burgh (the location of the site). Statistics obtained from the National Archives indicated the area sustained an overall very high density of bombing, with an average of 170.8 bombs recorded per 1,000 acres. As such, the site was classed as having a 'medium risk' of unexploded ordinances (UXO) and risk mitigation methods were required prior to commencement of works.

Solution

- RB installed Continuous Helical Displacement (CHD) piles to varying depths for compression loads up to 600kN. Maintained load testing of piles returned excellent results, well within tolerances set by the project engineer.
- The CHD pile was selected as it generates negligible levels of noise and vibration, and creates no appreciable arisings meaning there is minimal spoil to remove from site. The pile is formed using a highly efficient multi-flight bullet ended shaft, driven by a torque rotary head, enabling penetration of the strata without bringing material to the surface. Data is recorded using computerised instrumentation. Nominal surface heaving may occur but, compared with the arisings from CFA boring, the volume is negligible.
- Kier Construction Scotland arranged for intrusive magnetometer surveys of all pile locations, extended to the maximum bomb penetration depth. The results of the report confirmed all proposed pile positions were free from UXOs and works could commence on programme.
- Upon commencement of piling operations, it was concluded that the dense granular strata was slightly deeper than detailed in the SI report. As such, pile design lengths were extended slightly and all piles were installed subject to torque drilling resistances.
- It was a snowy start to works on site, with snow falling each day during the first week. Similarly, for the duration of the works, temperatures rarely reached 5°C (once as low as -8°C) and a specialised hot water mix was developed and utilised for the duration of the works.

Kier Site Manager, Edward Balmer praised:

"The excellent work carried out by your company with credit going to your entire team from delivery to removal of piling rig".



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